

LS-23
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Computers for the Control Of Experiments
and Data Acquisition

This preliminary note is concerned with the computer needs at the experimental stations on the 6-GeV storage ring from the user's stand-point.

Some of the specific front-end tasks can be broadly described as follows:

- The computer at the experimental station will drive stepping motors, other electromechanical devices and many electronic switches which control the motion of optical elements, sample stages, beam line aligners, undulator gaps, corrective feed back processors, fail-safes, etc. These are based on interfaces such as CAMAC, FASTBUS, etc.
- Data acquisition and real time analysis involving background subtraction, preliminary processing, analog display, transfer of semi-processed data to mass storage, etc. Since a prompt inspection of the previously collected data or the data that is being collected is essential to monitor the progress of the experiments, graphic manipulation capability (scale expansion, peak location, data overlay, windowing, etc) should be possible at the experimental station.
- The developments in x-ray detectors will generate data which is beyond the handling capabilities of the conventional computers. Special parallel read out procedures will have to be developed to handle such tasks using for example a multiprocessor bus.

- A more complete analysis of modest sized data needs to be carried out on the computer at the experimental station without the necessity of transferring the data to a central computer facility. Each of the experimental station computers will then have a multitask processor to support real time experiments as well as the analysis of previously acquired data. In addition to excellent CRT graphics capability mentioned above, a modest amount of hard-copy graphics should be possible at the experimental station.

A central computer facility should be available for tasks demanding large and/or long-term information storage and large CPU time. In addition, the central facility should have the capability to link via national and international networks (e.g. ETHERNET or satellite hook-up) to the computers at the users' home institution. The total compatibility of software between the computers at the experimental stations and the central computing facility would be very desirable.

GKS/b